

Due: Wed. Sept. 27

HMC Math 142 Fall 2017  
Prof. Gu  
Problem Set 4

Start this assignment before Sunday night!

**Read:**

- Baby Do Carmo, Differential Geometry of Curves and Surfaces: Sections 2-1, 2-2, Chapter 2
- Handout 5
- Lecture Notes

**Do:**

**A: Problems on Reviewing of Rigid Motions in  $R^3$ .**

- a) Show that the set of rigid motions  $E(3)$  forms a group. (Later, we will see that  $E(3)$  is in fact a Lie group.)

**B: Problems from Lectures**

- a) Show that of all simple closed curves in the plane with given length  $l$ , a circle bounds the largest area.

**C: Other Problems**

- a) Problem 2 on page 29, Section 1-6, Baby Do Carmo.
- b) Problem 1 on page 47, Section 1-7, Baby Do Carmo.
- c) Problem 2 on page 47, Section 1-7, Baby Do Carmo.
- d) Problem 3 on page 65, Section 2-2, Baby Do Carmo.
- e) Problem 5 on page 65, Section 2-2, Baby Do Carmo.
- f) Problem 10 on page 66, Section 2-2, Baby Do Carmo.
- g) Problem 16 on page 67, Section 2-2, Baby Do Carmo.

### D: Extra Credit Problems

- Give a different solution to B a).